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## **Risk communication in the dental practice**

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## ***Abstract***

The communication of risk in dental settings is a routine task that most clinicians are familiar with in their clinical encounters. Work from medical settings however, has suggested that using this process in order to support health behaviour change in people may well be undermined by difficulties in understanding risk information *per se*, in presenting the information in a way that is clearly understood by the recipient and in the effects that such information may have for supporting further health behaviours by patients. This paper synthesises some literature in the area that addresses these issues and explores approaches dental care professionals might consider when communicating risks in the dental surgery.

## ***What is risk? Cognitive and emotional impacts of risk communication***

Risk is a concept that most people feel familiar with yet few are in a position to estimate accurately or make decisions on the basis of it. Risk may be defined as the probability that a hazard will give rise to harm (1). In healthcare settings in particular, risk is conceptualised as a possibility of loss, injury, disease, or death ([www.merriam-webster.com/medical/risk](http://www.merriam-webster.com/medical/risk)).

Communication of risk is an important and potentially difficult aspect of dentists' clinical practice. The medical literature has suggested that communication of risk should be about telling patients what is the probability of the risk occurring, explaining the adverse event characteristics that might occur and finally, being open and honest about the effect of the adverse event on the patient (2). Such a discussion would most likely take place within the parameters of a patient-centred care paradigm where patients are supported to make decisions about their own health having been given tools and choice over possible courses of action (3-5).

Risk communication has ethical, practical and behavioural angles to it; firstly, from an ethical point of view patients are expected to be informed about the risks of dental procedures so they might give genuinely informed consent to undertaking them. The General Dental Council for example, clearly states in

its standards the need for the dental team to obtain valid consent before treatment where the risks and potential benefits of treatment have been fully explained (6). Practically, risk assessment is routinely undertaken to gauge whether, given any known associated risk factors, the patient is at risk from oral disease and secondly, if disease is present, to formulate prognoses and decide whether it is clinically appropriate to go through with a given procedure (7). Finally, where the success of most dental procedures partly rests on patients' preparedness to adhere to instructions given by the dental team, patients' understanding of the risks associated with non-adherence with clinical recommendations might be arguably be a benefit or hindrance to such behaviours.

Generally, risk communication is considered by most a cognitive process that is primarily going to have an impact on patients' understanding of treatment choice and treatment planning. For example, a dentist might explain the risks involved in the provision of a crown on a heavily restored/worn/fractured lower first molar and the health risks involved where no crown is fitted with the view of educating the patient about those issues. Here, there are many different risks at every stage (from the point of administration of local anaesthesia to tooth preparation and final fit) that need to be communicated effectively so that the patient might understand them. For example, there are many types of crown available and the clinician needs to explain the advantages and disadvantages of each type. Patients need also to be warned about the risks to the integrity of the remaining tooth structure by undergoing tooth preparation and possible risk of post-operative sensitivity, risk of pulp damage and pulp death. In terms of patient understanding then, there is the potential for information overload and the dentist needs to find a way to identify and to communicate the risks that are of most relevance to the individual patient.

At the same time, there is an emotional aspect to the communication of such risk information; this, may have a stronger impact on people's minds than the objective risk estimate. For example, telling a patient that there is a high risk that the crown might fail (alongside the time and cost implications that such a process might be associated with) is likely to elicit an emotional reaction of

either reassurance or worry. As such, the person's assessment of and reaction to the risk information could be "*primarily determined not by facts, but by emotions*", a finding that has been often reported in the medical literature (8).

The fact then that risk communication might impact patients in two ways – on their objective understanding of the clinical procedure but also on their emotional reaction to this information makes the process of risk communication a process worthy of special attention.

The section that follows considers some aspects of risk communication that might be of interest to clinicians working with patients in the dental surgery.

### ***Common issues in risk communication***

Researchers have been studying how best to communicate health risks for a long time and have reached some broad conclusions that are now generally well-accepted. We know, for example, from systematic reviews on the subject that some ways of presenting risks (e.g. bar charts) are more helpful to patients than others (9). We also know that patients tend to forget quite a lot of what takes place in a medical (10) or dental consultation (11), especially information that has to do with future oral health advice. In particular, where people are asked to recall material having experienced pain or discomfort, recall is compromised by the state patients were in at encoding. (12) Finally, whilst patients' trust in their healthcare provider may well be a reasonable predictor of recall, there are currently no reliable data to show that patients recall more from physicians that are highly trusted (13).

Health literacy on the other hand, has been well researched and it is now accepted that health literacy plays a major role in determining how much patients will understand and retain within a consultation (14). With risk communication in mind in particular, it would appear that health literacy is particularly important where risk communication is said to be undermined by what has been termed as "*Collective statistical illiteracy*"- a situation where

most adults have difficulty understanding basic statistical information (15). Risk information rests on basic understanding of the concept of probability and frequency estimation, processes that people often find difficult to grasp. For example, in a study of American undergraduates rating how risky cancer was they rated cancer as riskier if they were told that it “*kills 1286 out of 10,000 people*” rather than if they were told that it “*kills 24.14 out of 100 people*” (16). Along similar lines, research has shown that even well-educated people have difficulty with interpreting simple risk questions such as deciding which of 1%, 5% or 10% represents the highest risk (17).

Clinicians seem to be affected by similar problems. In a study of experienced physicians, participants were asked to estimate the probability that a patient had colorectal cancer, if they tested positive on a faecal occult blood test (FOBT) known to have a sensitivity of 50%, a false positive rate of 3% and where the prevalence of this cancer is 0.3%. The range of these medical professionals’ answers was wide - from 1% to 99% with most answers being around the 50% mark (18). The correct answer is 5%. The need for clinicians to be supported in their interpretation of risk estimates has been called for in response to these and other similarly alarming data suggesting difficulty understanding and responding to statistical information pertaining to risk (15).

To complicate matters further the way risk is framed may well influence how people respond to it. ‘*Framing manipulation*’ is the presentation of information that is logically equivalent in different, either positive or negative ways. For example, telling a patient that a procedure carries a 5% risk of failure is logically equivalent to telling them that it is successful in 95% of cases, but the emotional reactions to these two statements are quite different. In a Cochrane systematic review of the effects of framing on how patients understand and behave towards medical interventions, it was shown that people perceived interventions to be more beneficial when these were presented using positive framing although subsequent patient behaviour on the basis of such framing did not differ between the two presentation formats (19).

Therefore, it is the case that if we consider the logical, objective point of view of risk communication as statistical information, there are difficulties on both the sender and recipient of such information in understanding this information.

Finally, behavioural scientists have shown that people do not objectively interpret risks; in a phenomenon termed '*Unrealistic optimism*' people have been shown to have a tendency to think they are less likely than others to have negative events happen to them (20-23). This is the case for a wide variety of negative events ranging from getting divorced to needing a tooth extraction. The belief usually leads people to take risks or engage in unhealthy behaviours simply because they do not consider themselves to be at risk or their judgments of personal risk are inaccurate. In practice, these are the people who e.g. will talk about there being no need to see the dentist preventively because they have "*good teeth running in the family*". The work that led to the proposition of this term was grounded in studies showing that people have difficulties accurately estimating risks and that in doing so, they engage in inaccurate social comparisons that reflect best on the self rather than the people they are comparing themselves to. Presenting risk information to recipients who hold these beliefs is likely to be a difficult exercise.

It would thus appear that risk communication can potentially be a minefield of misunderstandings. Misunderstandings of basic risk estimates and statistical probabilities may well undermine clinicians' efforts to communicate risk effectively to patients, but patients' psychological predisposition to evaluate risks in an overly optimistic way can further add to the confusion.

### ***Risk communication in dental settings- what should be communicated?***

Given that risk communication is not particularly straight-forward a process, how much of this process does the dental team really need to engage with?

The risks that need to be communicated in dental settings can be divided into two broad groups, which do overlap: the risk of developing dental disease (and how that risk might be mitigated) and the risks associated with

established disease including prognosis, treatment and maintenance.

Additionally, some patients may be dentally anxious or have dental needs that make dental care difficult to tolerate necessitating the use of pharmacological behavioural management techniques such as conscious sedation and general anaesthesia. The continuum from conscious sedation to general anaesthesia is accompanied by an increased risk of adverse events due to the increasing depression of the physiological systems (24) (25).

Finally, risk communication with regard to procedures such as sedation and general anaesthesia is a special case in itself. These areas are explored in turn.

#### *Risk of developing oral disease*

There is a huge body of work describing the risk factors and distribution of oral diseases and conditions to which people are susceptible: dental caries, tooth surface loss, periodontal disease, oral infectious diseases, dental trauma, hereditary lesions and oral cancer. A risk factor may be defined as '*any characteristic, behaviour or exposure with an association to a particular disease*' (26) and which is not necessarily causal (7). Modifiable risk factors for oral diseases have been identified as an unhealthy diet, poor oral hygiene, tobacco use, harmful alcohol use, and social determinants (27). Determining whether a person develops a disease is based on an assessment of probabilities, which might be expressed as the proportion of people expected to experience the condition in a given time frame. Many dental diseases are very prevalent and the risk of developing them persists throughout the life course. In parts of the UK dental disease still affects a significant proportion of the population for example in England, Wales and Northern Ireland in 2013, 46% of 15 year olds and 13% of 12 year olds had obvious decay experience and 10% of 15 year olds experienced trauma to their permanent teeth (28, 29); while the proportion of adults experiencing caries into dentine in 2009 was 31%, and 45% had at least one periodontal pocket greater than 4mm (30).



Many of the modifiable risk factors for dental disease are well known and there is now a well established and comprehensive evidence base for prevention of dental diseases e.g. *Delivering Better Oral Health* (27) but the best way to communicate this information requires more research and development. Reviews of the effectiveness of oral health education at the individual and population level show that many traditional approaches do not work, and lack psychological understanding of what helps people change their oral health behaviours (31, 32). Additionally, it is important that risk communication is tailored to the individual (so as not to overload them with information about risk factors which are not relevant for them), while at the same time addressing common risk factors for a number of oral diseases (33).

#### *Risks associated with established disease*

An overlapping activity is communicating risks about diseases in people showing signs of early and established disease. This would include discussion about prognosis and the prognostic factors (e.g. severity of clinical status such as level of attachment loss) relating to success and survival; discussion of different treatment options such as minimum expected success period, and the potential impact on a successful long-term outcome(7). The need for maintenance is also an important consideration particularly if it is dependent on a patient adhering to new behaviours or ceasing others.

#### *Risk communication for pharmacological behaviour management*

Certain clinical situations call for dental treatment to be supported through the use of conscious sedation or general anaesthesia. In such cases, for example in the use of conscious sedation, the clinician would be required to include risk communication in relation to the dental procedures and prognosis, but also in relation to the risks and benefits associated with the conscious sedation (34). While there is some detailed information available on what the potential risks and benefits of conscious sedation are (34), the best way to communicate about these risks without unduly alarming patients is still unclear and left to individual clinicians' skill and judgment. There is a further

additional challenge in these cases where patients lack capacity to consent to care.

### ***Risk communication in dental settings – current practice***

Risk in general dental practice has tended to focus on medico-legal risks and how to mitigate these so as to avoid litigation rather than in order to truly engage with patients to communicate disease, treatment and procedure risks – which may well the reduce risks of medico-legal action by unsatisfied patients anyway. In a rather dated but key paper reporting on communication behaviours in US physicians who had either been reported for ‘malpractice’ or had not, it was found that doctors who had had claims against them communicated quite differently to those with no such history. So, malpractice-claim-free doctors tended to have longer consultations (by three minutes, at just over 18 min), laughed more and used humour more than their claim-history counterparts. In addition, the claim-free group tended to use more orienting language, that is setting the scene for the patient (telling them what would happen at the consultation and managing the patient expectations) and engaged more with patients in a direct way by asking them their opinion, encouraging patients to talk and checking their understanding. Whilst this work did not consider risk communication explicitly, it is important in that it highlights the general framework within successful risk communication might reasonably take place.

In terms of risk-specific tools to communicate accurate risk information, there are a range of specific disease risk assessment tools available based on biological factors, clinical status and exposure risk. Such risk assessment tools are still in development and while some of the periodontal risk calculators have showed promise (35, 36), a review of caries risk assessment tools was less favourable suggesting that evidence for their validity was limited and weak (37). None of the disease-specific tools is widely used in dental practice currently.

The presentation of risk simply through RAG rating (red high risk, amber medium risk, green low risk) shows promise. The NHS Dental Contract

Reform Prototypes (38) use a preventive care pathway which begins with a standardised assessment to gather information on and assign risk in four clinical areas: dental caries, periodontal disease, tooth surface loss and soft tissue conditions. Risk is assigned based on clinical factors and patient factors (behaviours). The associated self-care plan provides patient-specific information using a red, amber and green system. RAG rating is suggested as *'a useful platform for communication with patients including awareness of their responsibility for self care'* (38)(p29). The risk rating also informs the recall interval and any preventive visits.

Although not widely adopted currently, a report reviewing the learning from the first two years of piloting noted that not all patients recalled being advised of their RAG status, but those who did were positive about it being helpful to understanding the health of their teeth and gums (39). The report also noted that people responded well to advice given, *'in so far as they were receptive to the information'* (p12)....and more work was needed on the presentation of care plans (considered too technical) and on understanding why some people did not remember receiving the information (39). It is clear that having accurate information in an easy to understand risk format, was not always sufficient to help people to engage with and to remember the information.

More broadly, the GDC has set out its guidelines as discussed but there is no mechanism to teach practical skills in risk communication to general dental practitioners. Such a situation leaves dental practitioners to acquire the basic ability through experience whilst at the same time there is increasing awareness that patient expectations demand better explanation, presentation and communication of risk. Some organisations such as the British Dental Health Foundation produce some reader-friendly leaflets using pictures and written explanations of types of treatments to show and give to patients. They do not communicate risk in any detail but they may be a positive aid to the clinician to help them establish a positive rapport with the patient so a discussion may develop to include communicating the risks orally of the various treatments available. But as Lewis & Newton observed (40) while many commercially available dental information leaflets were easy to read,

few outlined the options of no treatment, effect on quality of life or encouraged shared decision-making. Some visual aids and plastic models are available to help to communicate the risk of periodontal disease by its effects, but little else is available to the general dental practitioner. The prototype RAG oral health assessment has piloted the provision of patient facing material, but the two year review suggested that the material currently was too technical, with some dentists preferring to give a verbal explanation focusing on specific problems rather than referring to the RAG score (39). Time pressure in a busy practice, particularly within the NHS, also limits the priority that might be given to risk communication.

### ***How should risk be communicated in dental practice?***

There is currently no definitive guidance on how the dental team should communicate risk to patients in the dental surgery. There is, however, the expectation from the GDC that risks should be communicated effectively:

*“You must listen to patients and communicate effectively with them at a level they can understand. Before treatment starts you must: Explain the options (including those of delaying treatment or doing nothing) with the risks and benefits of each” (6)(page 22).*

Research is necessary to establish how and what risks should be routinely communicated in dentistry as well as the effects of such communication on patients’ understanding and subsequent health behaviours. Medicine has made some progress in this area over the recent past suggesting that personalised rather than general risk estimates, presented in the form of natural frequencies rather than percentages or probabilities may well be beneficial (9). The risks that are communicated in dental practice are somewhat different to those normally discussed in medicine however and may not be subject to the same procedures.

Given these observations, we suggest that risk communication in dental settings is an area that is worthy of further research. In particular, research

questions into risk communication within the dental surgery necessarily need to ask:-

- 1) What do clinicians understand by risk communication?
- 2) What do patients understand by risk communication, how do they interpret it and what would they like to know or have explained to them and in which format would they prefer to have information communicated?
- 3) What risks should be routinely communicated in the dental surgery?
- 3) What are the best methods to communicate risk to patients (i.e. the most clearly understood)?
- 4) How can this research be assimilated to increase patient understanding of risk, leading to more effective and valid consents for treatment, and resulting in improved clinical outcomes?

## **Conclusion**

This paper has synthesised some of the key issues that are relevant in risk communication in healthcare settings. In doing so it has reviewed some overarching work that clinicians need to be aware of when attempting to discuss risk with patients in the dental surgery. More research is necessary to properly understand risk communication in dentistry and to be able to support the dental team in effective risk communication in day-to-day practice.

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